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Notes on Equilibrium Exchange Rates: January 2010

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In June 2009 we issued our annual update of estimates of fundamental equilibrium exchange rates (FEERs) for 34 major economies (Cline and Williamson 2009). At that time the dollar had already begun correction from the substantial overvaluation that had arisen from the strong safe-haven effect associated with the global financial crisis of 2008–09. In this policy brief we report on changes in disequilibria in the exchange markets since the date those earlier calculations referred to, namely March 2009. We first present estimates of the extent of movement toward FEER-consistent bilateral dollar exchange rates from March to December 31, 2009, and then look at how effective exchange rates have altered in the same period. We also re-estimate the FEER-consistent dollar rate for one important currency, the Korean won.

We present four major findings in this update. First, the overvaluation of the dollar has been sharply reduced from March to the end of 2009, from about 17 percent to about 6 percent. Second, the remaining overvaluation of the dollar would be completely eliminated if the five East Asian economies with seriously undervalued exchange rates were to appreciate to FEER-consistent levels: China (whose effective depreciation has increased and needs the most effective and bilateral appreciation, the latter at 41 percent in the main estimate), Hong Kong (32 percent), Malaysia (31 percent), Taiwan (29 percent), and Singapore (25 percent). Third, several economies have experienced such large appreciations that they have swung from undervaluation to substantial overvaluation in their effective exchange rates. These include Australia, Brazil, Hungary, Indonesia, New Zealand, Poland, and South Africa. These economies typically have high interest rates, and their substantial currency overshooting reflects the shift in the international financial environment from acute panic and safe-haven influences in early 2009 to carry-trade dynamics by the end of the year in the face of zero US short-term interest rates. Fourth, for Korea, a revised estimate of the FEER-consistent exchange rate against the dollar now places it at about 1,000:1, about halfway between our June 2009 and July 2008 estimates, which had shown a large divergence.

THE DOLLAR'S CORRECTION

The easing in the global financial crisis has reversed the strong upward pressure on the dollar from the safe-haven effect. Just as March 9, 2009 was the trough in equity market prices, the March base used for the previous FEER calculation turned out to be the high point of the dollar. Using the Federal Reserve's broad real trade-weighted exchange rate index, the dollar had

risen from a trough of 84.8 in March 2008 to a peak of 97.3 in March 2009. By December, the same index had fallen back to 87.0, representing a decline of 10.6 percent in just eight months (Federal Reserve 2010). As a consequence, a large number of currencies that were diagnosed as being significantly undervalued against the dollar in our June 2009 FEER estimates have now approximately reached their FEER-consistent levels or overshot. However, many of these currencies were found not to be significantly misaligned on a multilateral effective basis in the last estimates, so it follows that they are now overvalued on that basis.

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Table 1 reports the June 2009 estimates of FEER-consistent dollar rates for 30 economies (34 were considered, but no estimates were made for those that principally export oil). These rates are shown for the March base and are also adjusted for differential inflation against the United States to arrive at an equivalent FEER-consistent rate as of December 31, 2009.[1] For most countries the changes are minimal, but they are substantial for the few high-inflation countries. The table also reports the percent appreciation against the dollar that would have been required to move exchange rates from their actual levels in March 2009 to their FEER-consistent levels (the rates that would prevail if all other currencies were at their FEERs). The same percent change concept is then reported against actual levels as of December 31.[2]

It is evident in the table that major changes have occurred. In the important case of the euro, whereas the currency was undervalued against the dollar by about 17 percent in March 2009, by end-December it had closed to about 7 percent below its FEER-consistent rate. Japan's bilateral undervaluation had also narrowed but only slightly (to about 16 percent from about 20 percent).[3] Several currencies have overshot from substantial undervaluation to overvaluation against the dollar, including those of Australia, New Zealand, South Africa, Brazil, Colombia, and to a lesser extent Indonesia, Hungary, and Poland. Two key trade partners for the United States, Canada and Mexico, have both swung from modest undervaluation against the dollar to somewhat greater overvaluation—by about 9 to 10 percent as of end-December.

For all 29 economies, undervaluation against the dollar had swung from about 17 to 19 percent to about 3 to 4 percent on the average and median measures in table 1. Weighting by importance in trade with the United States, the overall change is from foreign undervaluation of 17 percent in March to only 5.6 percent by December 31. It is evident in table 1 that by now only a single bloc of economies remains severely undervalued against the dollar: the East-Asian group that includes China (still needing 41 percent appreciation against the dollar to reach its FEER), Hong Kong (still 32 percent), Malaysia (31 percent), Taiwan (29 percent), and Singapore (25 percent).[4] They are equivalently undervalued against most other currencies. If these economies all moved to their FEER-consistent exchange rates against the dollar, foreign exchange rates weighted by importance in US trade would swing from 5.6 percent undervaluation to 1.0 percent overvaluation. Thus, the remaining overvaluation of the dollar would be slightly more than fully eliminated if these five East Asian currencies were to appreciate to FEER levels.

CHANGES IN REAL EFFECTIVE EXCHANGE RATES

What interests (or at any rate, should interest) most countries is not their bilateral rate in terms of the dollar but their effective exchange rate in terms of all other currencies. We therefore calculated the percentage changes in the real effective exchange rates (REERs) of our 30 currencies between March and November 2009 (the latest date for which data are available) according to the REER estimates of the Bank for International Settlements (BIS 2009). These figures are shown in column 1 of table 2. In column 2 they are compared with the percentage changes in REERs, against the March base, that were shown as needed to establish FEERs in Policy Brief 09-10 (Cline and Williamson 2009, table 2, column 3). It can be seen that in several cases where we concluded that a depreciation was needed, the result of the changes in the

1. Inflation rates are from IMF (2009b).

2. Exchange rates for December 31, 2009 are from the *Financial Times*, January 4, 2010.

3. In late November the yen had strengthened to 87 per dollar, but by year-end it had retreated to 93 per dollar.

4. However, see the caveat for China below.

Table 1 FEER-consistent exchange rates against the dollar

	FEER-consistent rates, March 2009 base		Actual dollar rates		Percent changes to reach FEER-consistent rates	
Country	March 2009	December 2009 equivalent	March 2009	December 2009	March 2009	December 2009
Pacific						
Australia[a]	0.73	0.73	0.67	0.90	9.0	–18.9
New Zealand[a]	0.62	0.62	0.53	0.73	17.0	–14.4
Asia						
China	4.9	4.9	6.8	6.8	40.2	40.7
Hong Kong	6.1	5.9	7.8	7.8	27.9	32.3
India	45	47	51	47	14.1	–1.5
Indonesia	9,707	9,884	11,922	9,395	22.8	–5.0
Japan	82	80	98	93	19.5	16.1
Korea[b]	1,197	1,201	1,450	1,164	21.1	–3.0
Malaysia	2.63	2.62	3.67	3.42	39.5	30.5
Philippines	40	40	49	46	21.3	14.8
Singapore	1.15	1.13	1.53	1.40	33.0	24.7
Taiwan	25.2	24.9	34.3	32.0	36.1	28.5
Thailand	29.5	29.7	35.7	33.3	21.0	12.4
Middle East/Africa						
Israel	3.69	3.63	4.17	3.79	13.0	4.3
South Africa	9.5	9.8	10.0	7.4	5.0	–25.2
Europe						
Czech Republic	17.9	17.8	21.0	18.4	17.3	3.5
Euro area[a]	1.53	1.54	1.31	1.43	16.8	7.2
Hungary	198	205	234	188	18.2	–8.0
Poland	3.10	3.13	3.56	2.86	14.8	–8.7
Sweden	6.6	6.7	8.6	7.1	29.5	6.6
Switzerland	0.90	0.89	1.16	1.03	28.9	16.6
Turkey	1.46	1.51	1.71	1.50	17.1	–0.5
United Kingdom[a]	1.65	1.65	1.42	1.61	16.2	2.5
Western Hemisphere						
Argentina	3.17	3.25	3.66	3.80	15.5	16.9
Brazil	2.02	2.06	2.32	1.74	14.9	–15.4
Canada	1.18	1.17	1.26	1.05	6.8	–10.2
Colombia	2,255	2,292	2,498	2,043	10.8	–10.9
Chile	549	541	603	507	9.8	–6.2
Mexico	14.0	14.3	14.6	13.1	4.3	–8.6
United States	1.00	1.00	1.00	1.00	0	0
Average					19.4	4.2
Median					17.1	2.5
US trade-weighted					17.0	5.6

a. US dollars per currency unit.
b. New FEER-consistent estimate for December 31, 2009: 1,011 won per US dollar. See text.

Sources: Cline and Williamson (2009); *Financial Times,* January 4, 2010; and authors' calculations.

exchange market has been to push currencies toward effective appreciation rather than depreciation: This is true for Australia and South Africa, and to a lesser extent India. In rather more cases where we estimated that the currencies were close to equilibrium, the effects have been to cause a substantial appreciation: New Zealand, Indonesia, Korea (but see below), the Czech Republic, Hungary, Poland, Turkey, the United Kingdom, Canada, Brazil, and Mexico. As would be inferred from the above, the United States has come distinctly closer to equilibrium. On the other hand, by riding the dollar down China has moved even further from equilibrium, so that its needed effective appreciation is now about 30 percent, in our main estimate.[5]

By riding the dollar down China has moved even further from equilibrium, so that its needed effective appreciation is now about 15 to 30 percent.

There is an important caveat to the estimates for China. Our annual estimates use as the medium-term baseline the longest-forward projection available in the IMF's spring *World Economic Outlook* (WEO), to allow for completion of lagged effects. Our June 2009 study thus used 2012 as the benchmark against which to calculate desired changes. The IMF's spring 2009 WEO projected China's current account surplus to 10.3 percent in 2009, 9.1 percent in 2010, 9.8 percent in 2011, and 10.6 percent in 2012 (IMF 2009a). It was against the latter figure that we calculated the change in the effective exchange rate needed to reduce the current account surplus to a target of 4 percent of GDP, based on a level consistent with holding constant the ratio of net foreign assets to GDP. However, actual recent trends have been toward far lower surpluses. Thus, for 2009 the actual current account surplus was only about 5.6 percent of GDP (World Bank 2009), not much over half of the Fund's projection in the spring. Looking forward, private forecasts place the surplus at about 5½ to 6 percent in 2010 and about the same in 2011 (Blue Chip 2010, Deutsche Bank 2010). The World Bank's Development Prospects Group places the surplus at 8.3 percent of GDP in 2010, but the Bank's Beijing office projects a much lower 4.1 percent of GDP (World Bank 2010, 2009). The latter estimate cites robust domestic demand and reversal of improvement in

Table 2 Actual REER changes, March–November 2009, compared with REER changes needed in March 2009 to reach FEERs (percent)

Country	Actual[a]	Needed[b]
Pacific		
Australia	26.3	–12.2
New Zealand	20.8	–0.7
Asia		
China	–8.4	21.2
Hong Kong	–6.9	–0.3
India	6.8	–5.2
Indonesia	15.8	–0.6
Japan	–1.3	–1.5
Korea	16.0	–0.5[c]
Malaysia	–1.6	17.7
Philippines	–3.2	–0.4
Singapore	0.9	10.3
Taiwan	–0.7	13.6
Thailand	–0.3	–0.4
Middle East/Africa		
Israel	3.3	–0.5
South Africa	22.2	–13.4
Europe		
Czech Republic	5.5	–0.4
Euro area	1.3	–1.2
Hungary	16.7	–0.4
Poland	12.7	–3.6
Sweden	8.5	12.4
Switzerland	2.4	12.6
Turkey	6.0	–0.6
United Kingdom	5.6	–0.7
Western Hemisphere		
Argentina	–15.2	–0.7
Brazil	26.7	–1.1
Canada	14.7	2.3
Chile	4.5	–6.4
Mexico	8.5	–0.7
United States	–12.0	–17.7

a. Percent change in REER from March to November 2009 (BIS 2009).
b. Percent change in REER from March 2009 base needed to reach estimated FEER.
c. As discussed in the text, this estimate (from our June 2009 study) substantially understated Korea's FEER.

Sources: BIS (2009) and authors' calculations.

5. Effective exchange rate changes needed to reach FEERs as of November 2009 are approximately equal to those needed as of March (table 2, column 2) minus the amount of change from March to November (table 2, column 1).

terms of trade, although it notes that the surplus is likely to widen again over the medium term.

Even allowing for cyclical factors temporarily narrowing the deficit (unusually large gap between China's growth and that in US and other industrial markets), these levels suggest that the IMF (2009a) baseline of 10.6 percent surplus in 2012 used in our FEER estimates (Cline and Williamson 2009) may be overstated and that the next round of IMF forecasts for the spring 2010 WEO may reduce the projected surplus.[6] Nonetheless, even a generous allowance of about 3 percent of GDP reduction from the previous baseline for China's current account surplus by 2012, to about 7 percent of GDP, would still leave the effective exchange rate undervalued by about half the amount previously estimated, or about 15 percent.[7] The corresponding undervaluation of the bilateral rate against the dollar would still be about 25 percent.

NEW ESTIMATE FOR KOREA

As reported in Cline and Williamson (2009), for a few countries our June 2009 FEER estimates were markedly different from those a year earlier (Cline and Williamson 2008). The three largest changes were for Korea, Australia, and New Zealand, which all showed 2009 FEER-consistent dollar rates about 25 percent weaker than the estimates a year earlier. For Australia and New Zealand the reason was a change in methodology constraining the target size of the current account deficit to a smaller range.[8] We hypothesized that Korea's new FEER estimate, in contrast, might be biased downward from the use of an IMF current account projection that substantially underestimated the eventual current account surplus that would arise if the exchange rate in fact were to remain at its extremely depreciated March 2009 base.

The new IMF WEO estimates for October 2009 (IMF 2009b) confirm our conjecture. They report the 2012 current account surplus for Korea at close to the same level as in the April 2009 WEO (IMF 2009a) despite a sharp appreciation. Thus, the 2012 surplus has eased only from 2.9 percent of GDP using the March exchange rate of 1,450 won per dollar to 2.2 percent of GDP using the October exchange rate of 1,280 per dollar. Using our impact parameter for Korea of 0.32 percent of GDP change in current account for a 1 percent effective appreciation, either the new current account surplus estimate should have been much lower or the previous surplus estimate was understated.[9]

A new FEER estimate for Korea thus seems appropriate. For this purpose we assume that this time the IMF has correctly projected Korea's current account. Because the 2012 current account of 2.2 percent of GDP is within our band of ±3 percent of GDP, the consequence of this approach is to conclude that the won is now no longer in need of any change in its trade-weighted REER. However, it could still require some appreciation against the dollar to maintain an unchanged REER in the context of a generalized move to FEERs and hence sharp appreciation against the dollar by some of Korea's largest trading partners in East Asia.

For Korea, a revised estimate of the FEER-consistent exchange rate against the dollar now places it halfway between our June 2009 and July 2008 estimates, which had shown a large divergence.

A rough approximation of a revised FEER-consistent dollar rate for Korea can be obtained by applying Korean trade weights to the exchange rate movements that would be called for in table 1 to move the individual currencies to their bilateral FEER-consistent dollar rates. When this is done, it turns out that the Korean trade-weighted changes to reach FEER-consistent rates from actual end-December levels for Korea's trading partners amounts to 15.8 percent. This sizable increase reflects the importance of China and other trading partners that need large appreciations to reach their FEER-consistent rates.

Applying the 15.8 percent estimate to the actual end-2009 level of the Korean won (1,164), the resulting new estimate of Korea's FEER-consistent dollar rate turns out to be 1,011 won per dollar. This level is relatively close to the simple average of our 2008 FEER for Korea (850 won per dollar) and our June 2009 estimate (1,197). At the same time, it should be emphasized that the concept of the FEER itself assumes

6. Already in October 2009 the IMF had reduced its 2012 estimate to 9.1 percent of GDP.

7. In our June 2009 estimates the target current account surplus for China was 4 percent of GDP, requiring an adjustment of about 6 percent of GDP or twice as much as would be required if the revised 2012 baseline were only a 7 percent of GDP surplus.

8. In 2008 we arbitrarily placed the limit for these two high investment economies at twice the standard 3 percent of GDP, or 6 percent. In 2009 we added the constraint that the deficit should not exceed the level consistent with avoiding an increase in the ratio of net external liabilities to GDP.

9. The 13.3 percent appreciation of the won should have cut the medium-term current account surplus by 0.32 x 13.3 = 4.3 percent of GDP, not the 0.7 percent cut shown by the IMF's figures.

that all currencies are at their equilibrium levels. If the most important trading partners remain at exchange rates that are seriously undervalued, then the country in question would tend to overshoot its current account target if it moved to its FEER-consistent dollar rate in isolation. This consideration applies not only to Korea but also to Japan. In both cases the additional appreciation against the dollar that would be called for to reach FEER-consistent dollar rates is approximately the same (about 16 percent), but this would produce overall equilibrium only if China and other key East Asian trading partners carry out the large appreciations called for. But because neither Korea[10] nor Japan stands in need of a change in its REER, if their partner East Asian economies do not appreciate to their own FEERs, the Korean and Japanese exchange rates are already at about the right levels.

10. Using the revised estimate of Korea's FEER, not the one on which table 2 was based.

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